REMARKS

By the present amendment and response, independent claims 18 and 26 and dependent claims 25 and 32 have been amended to overcome the Examiner's objections. Claims 1-10 and 14-32 remain in the present application. Claims 1-9 have been allowed. Reconsideration and allowance of pending claims 10 and 14-32 in view of the following remarks are requested.

The Examiner has rejected claims 18, 25, 26, and 32 under 35 USC §112, first paragraph. Applicant has amended claims 18, 25, 26, and 32 to overcome the Examiner's objections. The Examiner has further rejected claims 19 and 27 under 35 USC §112, second paragraph. Applicant has amended independent claim 18 to overcome the Examiner's objection to dependent claim 19 and Applicant has amended independent claim 26 to overcome the Examiner's objection to dependent claim 27.

The Examiner has further rejected claims 26-28 under 35 USC §102(e) as being anticipated by U.S. patent number 6,030,541 to Adkisson et al. ("Adkisson"). For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by amended independent claim 26, is patentably distinguishable over Adkisson.

The present invention, as defined by amended independent claim 26, teaches a process including steps of providing a substrate, forming an anti-reflective coating above the substrate, patterning the substrate to form a stack, and removing the anti-reflective coating without applying an oxide after the formation of the anti-reflective coating. As disclosed in the present application, the anti-reflective coating comprises a silicon

oxynitride layer situated over an oxide layer. As disclosed in the present application, if a stack has been re-oxidized before removal of the oxynitride layer in the stack, the time required to etch the oxynitride layer in hot phosphoric acid can cause serious etching of the exposed edge of the silicon nitride included in an interpoly dielectric layer in the stack. However, if the stack has not been re-oxidized prior to removal of the oxynitride layer, the oxynitride layer can be etched in hot phosphoric acid at a much faster rate without deleteriously etching the exposed edge of the silicon nitride. Thus, by removing the anti-reflective coating without applying an oxide after the formation of the anti-reflective coating, the present invention advantageously allows the oxynitride layer in the stack to be etched in hot phosphoric acid at a rate sufficient to prevent undesirably etching the exposed edge of the silicon nitride in the stack.

In contrast, Adkisson does not teach, disclose, or suggest a process comprising removing an anti-reflective coating in a stack without applying an oxide after the formation of the anti-reflective coating. Adkisson specifically discloses providing a layer 12 of a hard mask material on semiconductor substrate 1, followed by deposition of TEOS to form hard mask material 14. See, for example, Adkisson, column 3, lines 60-67 to column 4, lines 1-6. In Adkisson, anti-reflective coating 16, preferably comprising silicon oxynitride, is then deposited on the layer of hard mask material 14. See, for example, Adkisson, column 4, lines 10-13. Adkisson discloses that it may be desirable to oxidize the top surface of the silicon oxynitride layer or deposit another oxide layer to prevent the occurrence of poisoning or acidification from photoresist. See, for example,

Adkisson, column 4, lines 33-39. In Adkisson, an exposed portion of anti-reflective coating 16 is removed after photoresist material 18 has been deposited, patterned, and developed on anti-reflective coating 16. See, for example, Adkisson, column 5, lines 4-26. Thus, Adkisson teaches away from requiring the removal of anti-reflective coating 16 without applying an oxide after the formation of the anti-reflective coating, since Adkisson discloses that it may be desirable to oxidize the top surface of the silicon oxynitride layer or deposit an oxide layer on the silicon oxynitride layer.

For the foregoing reasons, Applicant respectfully submits that the present invention, as defined by amended independent claim 26, is not suggested, disclosed, or taught by Adkisson. As such, the present invention, as defined by amended independent claim 26, is patentably distinguishable over Adkisson. Thus, claims 27-32 depending from amended independent claim 26 are also patentably distinguishable over Adkisson.

The Examiner has further rejected claims 10, 14, and 32 under 35 USC §103(a) as being unpatentable over Adkisson and "Silicon Processing for the VLSI Era Volume 1: Process Technology," pp. 429-455 and 518, by Wolf et al. ("Wolf"). For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by independent claims 10 and 14, is patentably distinguishable over Adkisson and Wolf.

The present invention, as defined by independent claim 10, teaches, among other things, a process comprising a step of etching silicon oxynitride in a phosphoric acid etchant without subjecting the silicon oxynitride to any temperature greater than about 400°C between a step of depositing and the step of etching the silicon oxynitride. By

etching silicon oxynitride in a phosphoric acid etchant without subjecting the silicon oxynitride to any temperature greater than about 400°C between a step of depositing and the step of etching the silicon oxynitride, the present invention, as defined by independent claim 10, achieves the advantages discussed above.

In contrast, as discussed above, Adkisson discloses that it may be desirable to oxidize the top surface of the silicon oxynitride layer or deposit another oxide layer to prevent the occurrence of poisoning or acidification from photoresist. See, for example, Adkisson, column 5, lines 4-26. However, oxidizing the top surface of the silicon oxynitride layer or depositing an oxide layer on the silicon oxynitride layer is typically accomplished at temperatures exceeding 400°C. Thus, Adkisson teaches away from requiring the removal of the silicon oxynitride layer without subjecting the silicon oxynitride layer to any temperature greater than about 400°C between a step of depositing and a step of etching the silicon oxynitride.

The Examiner has cited Wolf for the proposition that the processing of photoresist is done with a temperature that is less than 400°C. However, Wolf does not teach, disclose, or suggest a process comprising a step of etching silicon oxynitride in a phosphoric acid etchant without subjecting the silicon oxynitride to any temperature greater than about 400°C between a step of depositing and a step of etching the silicon oxynitride. Thus, the present invention, as defined by independent claim 10 as set forth above, is patentably distinguishable from Adkisson, either singly, or in combination with Wolf.

Also, the present invention, as defined by independent claim 14, among other things, etching a second layer of silicon oxynitride in an etchant comprising hot phosphoric acid, where the etching occurs before the second layer is subjected to any temperature greater than about 400°C. Similarly, for the reasons discussed above, the present invention as defined by independent claim 14 is not suggested, disclosed, or taught by Adkisson, either singly, or in combination with Wolf. Thus, the present invention, as defined by independent claim 14, is patentably distinguishable from Adkisson, either singly, or in combination with Wolf. As such, claims 15-17 depending from independent claim 14 are, a fortiori, also patentably distinguishable over Adkisson and Wolf.

The Examiner has further rejected claims 18, 19, 23, and 25 under 35 USC §103(a) as being unpatentable over Adkisson and further in view of U.S. patent no. 5,620,913 to Hsiao-Lun Lee ("Lee"). For the reasons discussed below, Applicant respectfully submits that the present invention, as defined by amended independent claim 18, is patentably distinguishable over Adkisson and Lee.

The present invention, as defined by amended independent claim 18, teaches, among other things, a process comprising forming an anti-reflective coating above a second polycrystalline silicon layer, and removing the anti-reflective coating without applying an oxide after the formation of the anti-reflective coating. By removing the anti-reflective coating without applying an oxide after the formation of the anti-reflective

coating, the present invention, as defined by amended independent claim 18, achieves the advantages discussed above.

In contrast, as discussed above, Adkisson does not teach, disclose, or suggest a process comprising a step of requiring removal of an anti-reflective coating without applying an oxide after formation of the anti-reflective coating. Also, Lee does not teach, disclose, or suggest a process comprising a step of requiring removal of an anti-reflective coating without applying an oxide after formation of the anti-reflective coating. In fact, Lee does not teach, disclose, or suggest utilizing an anti-reflective coating. Similarly, for the reasons discussed above, the present invention as defined by amended independent claim 18 is not suggested, disclosed, or taught by Adkisson, either singly, or in combination with Lee. Thus, the present invention, as defined by amended independent claim 18, is patentably distinguishable from Adkisson, either singly, or in combination with Wolf. As such, claims 19-25 depending from amended independent claim 18 are, a fortiori, also patentably distinguishable over Adkisson and Lee.

The Examiner has further rejected claims 15-17, 20-22, and 29-30 under 35 USC §103(a) as being unpatentable over Adkisson, Adkisson/Wolf, or Adkisson/Lee as applied to claims 14, 19, and 27, and further in view of U.S. patent number 5,968,324 to Cheung et al. As discussed above, amended independent claim 18 is patentably distinguishable over Adkisson and Lee and amended independent claim 26 is patentably distinguishable over Adkisson. As such, claims 15-17 and 20-22 depending from amended independent claim 18 are, a fortiori, also patentably distinguishable over Adkisson and Lee and claims

29-30 depending from amended independent claim 26 are, a fortiori, also patentably distinguishable over Adkisson.

The Examiner has further rejected claims 24 and 31 under 35 USC §103(a) as being unpatentable over Adkisson or Adkisson/Lee as applied to claims 18 and 26, and further in view of U.S. patent number 6,245,682 to Fu et al. As discussed above, amended independent claim 18 is patentably distinguishable over Adkisson and Lee and amended independent claim 26 is patentably distinguishable over Adkisson. As such, claim 23 depending from amended independent claim 18 is, a fortiori, also patentably distinguishable over Adkisson and Lee and claim 31 depending from amended independent claim 26 is, a fortiori, also patentably distinguishable over Adkisson.

Based on the foregoing reasons, the present invention, as defined by independent claims 10 and 14 and amended independent claims 18 and 26 and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, claims 10 and 14-32 pending in the present application are patentably distinguishable over the art cited by the Examiner. For all the foregoing reasons, an early Notice of Allowance directed to the already allowed claims 1-9 and pending claims 10 and 14-32 is respectfully requested.

It is noted that **Applicant's attorneys have changed** and a copy of the "Revocation and Power of Attorney" already filed in the present application is attached hereto. The Examiner is respectfully requested to direct all correspondence with Applicant's new attorneys whose contact information appears below.

Respectfully Submitted,
FARJAMI & FARJAMI LLP

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 18, 25, 26, and 32 have been amended as follows:

18. (Twice Amended) A process comprising:

providing a semiconductor substrate;

forming a gate oxide above the semiconductor substrate;

forming a first polycrystalline silicon layer over the gate oxide;

forming an interpoly dielectric;

forming a second polycrystalline silicon layer over the interpoly dielectric;

forming an anti-reflective coating above the second polycrystalline silicon layer;

patterning the device to form a stack; and

removing the anti-reflective coating without applying an oxide [between] after the formation of the anti-reflective coating [and the removal of the anti-reflective coating].

25. (Once Amended) The process of claim 19, wherein the [antireflective coating] silicon oxynitride layer is removed before subjecting the [anti-reflective coating] silicon oxynitride layer to a temperature greater than about 400°C.

26. (Once Amended) A process comprising:

providing a substrate;

forming an anti-reflective coating above the substrate;

patterning the substrate to form a stack; and

removing the anti-reflective coating without applying an oxide [between] after the formation of the anti-reflective coating [and the removal of the anti-reflective coating].

32. (Once Amended) The process of claim 26, wherein the [antireflective coating] silicon oxynitride layer is removed before subjecting the [anti-reflective coating] silicon oxynitride layer to a temperature greater than about 400°C.